DOCUMENT RESUME

ED 234 589 EC 160 482

TITLE Chronicle of Academic and Artistic Precocity, Vol. 1, No. 2, March/April 1982.
INSTITUTION Arizona State Univ., Tempe, Dept. of Special Education.
PUB DATE 82
NOTE 8p.; Published by the Project for the Study of Academic Precocity. For related documents, see EC 160 481-484.
AVAILABLE FROM Chronicle of Academic and Artistic Precocity, c/o PSAP, Department of Special Education, Arizona State University, Tempe, AZ 85287 ($7.50 per year).
PUB TYPE Collected Works - Serials (022) -- Journal Articles (080)
JOURNAL CIT Chronicle of Academic and Artistic Precocity; v1 n2 Mar-Apr 1982

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Computer Assisted Instruction; *Computers; Elementary Secondary Education; *Gifted; *Museums; *Science Programs; Testing

ABSTRACT

The chronicle describes programs and offers other information relevant to the education of gifted students. The following are among the articles and features contained in this issue: "Science Museums and Gifted Students" (about the role of science centers in the education of gifted students) by M. Hyman; tips for students on Advanced Placement Program examinations by C. Benbow and J. Stanley; "Announcing Arizona's First Computer Camp" by P. Walkington; an article giving the life history of Wolfgang Amadeus Mozart by C. Irwin; "Accelerate with Apples" (on computer assisted instruction using the Apple II computer) by J. Boyle; and a puzzle of the month. (SW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
S. J. Cohn
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CHRONICLE OF ACADEMIC AND ARTISTIC PRECOCITY

Vol. 1, No. 2 | March/April 1982

Published by the
Project for the Study of Academic Precocity (PSAP)
Department of Special Education
Arizona State University
Tempe, Arizona 85287
(602) 965-4757

ED234589

SCIENCE MUSEUMS AND GIFTED STUDENTS[1]

Mary B. Hyman[2]

Every year, more than 2,000 above-average students, ranging from the bright and motivated to the gifted and precocious, attend accelerated math and science courses designed and administered by the Maryland Science Center, the Baltimore home of the Maryland Academy of Sciences. This unique program, conducted in cooperation with Maryland's public, private, and parochial school systems, can be replicated in most science centers in the United States.

The formula for such a venture is simple, but two ingredients are essential to its success. First, it should rest on a clearly defined philosophy of gifted education and an understanding of the role science centers and museums should play, and second, the program's directors and staff must possess an abundance of imagination and energy. Extensive funding, elaborate facilities, a complex bureaucracy, and a large staff are not vital. But before the specifics can be discussed, the basic function of science center educators and the ways in which they can effectively be involved should be examined.

The dearth of accelerated science curricula in the schools is, at long last, almost universally admitted. Educators now agree that gifted children are starved for academic enrichment and accelerated learning, and science centers have a duty to meet the challenges presented by these students. Unfortunately, it is difficult for science center educators to focus specifically on the gifted child when their role in the mainstream of education has never been clearly defined. The underlying philosophy of science museum programing is often vague and contradictory. Even when a consensus is reached in terms of presenting new programs or following suggestions of school administrators, the practicalities for implementing new ideas seem to be overwhelming. The education department is, nevertheless, usually considered an integral part of the museum.

The Association of Science Technology Centers (ASTC) has, for example, held several national conferences specifically to discuss the role of museum education. *Museums USA* reported, in 1973, that 98 percent of all science museum directors believed that providing educational experiences for the public was of prime importance and 48 percent placed high priority on educating the young, (*Museums USA*, 1974, p.27). As Lee Kimche (1978, p.270), former director of the Institute of Museum Services, said, "Science centers have a unique opportunity to assist a large segment of the public to gain a greater understanding of the contemporary scientific and technological issues of society."

It is not surprising, therefore, that a great deal of time and energy are spent in trying to resolve the dilemma of education in a science center. Yet in attempting to arrive at solutions, educators sometimes overlook their obligation to promote the advancement of science and technology. In taking on this responsibility, science centers cannot be a substitute for schools in providing science education. Museum educators can, however, hope to reach those students with the greatest potential for achievement in science who are not exposed to the types of accelerated and enriched courses they need. Harold Lyon, former director of the Department of Education's Office of Gifted and Talented, noted, "There are probably two to two and one-half million gifted and talented children in the country, and we think about twelve percent of them are now being served" (Bennetts, 1980, p.20E).

To understand further the philosophy of accelerated science programming it is necessary to review the plight of the gifted science student. Most schools lack the money and personnel to provide advanced, quality science and math courses that offer more than the basic concepts. Elementary and middle school teachers often have little or no science background and, consequently, are ill-equipped to impart more than a minimum of scientific knowledge to their students. According to a recent survey by the National Assessment of Educational Progress, the performance in science by students from ages 9 to 17 is declining at an alarming rate. In a sampling of classrooms during the 1976-77 school year, examinations showed that of all the grade levels, high-school students had the poorest knowledge of science, especially in the physical sciences. Younger children's ability and understanding were weaker than in the 1969-70 and 1972-73 analyses, but they were not as abysmal as those in the upper age levels (Maeroff, 1979, p.3). Furthermore, school budgets have suffered nationwide, and in the back-to-basics crusade, many fringe subjects — advanced science and math included — are in danger of being eliminated.

The poor quality of science education in a great number of schools is particularly detrimental to bright and motivated science and math students. These youngsters suffer from the prevailing myth that because they are already bright and curious their instructional needs are few. The cliche is, "They can get it on their own." This simply is not true. According to a report by the New York State Board of Regents, ". . . the continued failure of local school districts to mount programs for the gifted is leading to frustration and boredom, making underachievers of such children and prompting some to drop out of school" (Seiter, 1979, p.3). The dropout phenomenon has been documented; a Midwest study found that gifted children leave school at a rate three to five times greater than others. The New York Times has stated that perhaps as many as "twenty percent of high school dropouts are gifted" (Saiter, 1979, p.3). From such reports it can be concluded tha. many schools are failing to meet the needs of the brightest and most creative students, those with the promise of contributing much to society.

Scientific research is now largely conducted in teams, and expecting a child to learn on his or her own does not foster the cooperative skills needed to work with others. Julian Stanley, professor of psychology and head of the Study for Mathematically Precocious Youth (SMPY) at the Johns Hopkins University, observed " . . . that stimulation by one's intellectual peers within a homogenously grouped class which is fast-paced by the teacher produces outstandingly good results. Most of our students who have tried self-pacing or correspondence study courses move far less swiftly and well than they do in special fast-mathematics classes" (Stanley, George, & Solano, 1977, p.96). Former U.S. Commissioner of Education Sidney Marland recently told Congress, "Increasingly, we are being stripped of the comfortable notion that a bright mind will make its own way. On the contrary, intellectual and creative talent cannot survive educational neglect and apathy" (Rice, 1980). Obviously, the aspiring Watsons and Cricks need laboratories in which to experiment and mentors to inspire them.

What have science centers done to meet the needs of these bright and motivated children? At present, many offer courses, teacher workshops, lectures and other activities designed to increase public understanding of science and enrich science education on the whole. Unfortunately, most centers are hampered in their efforts by limited staff and facilities. Education departments range from those employing only professional science teachers to those relying completely on volunteers. The majority consist of a few full-time educators with

EC 160482

backgrounds in science teaching, several part-time people who may have science teaching skills, and a number of volunteers trained by the staff. Programming is generally designed for school visits.

Field trips vary from the "lock-step" tour of exhibits to participation in classroom sessions, short science demonstrations, planetarium shows, and science theater presentations. However, the escalating cost of bus transportation and tight school budgets will undoubtedly force science centers into alternative ways of cooperating with school systems. The benefits of school tours, even if they continue to be popular, are dubious. As Watson M. Laetsch, former director of the Lawrence Hall of Science in Berkeley wryly commented at the October 1977 ASTC meeting at the Fernbank Science Center, "Probably for the majority of students, the highlights of the trip are the bus ride, lunch, and the museum shop." The laughter accorded his remark showed that he had struck a responsive chord in the audience of museum directors and educators. This is not to imply that the science center is unimportant as a place where families and individuals can go to view exhibits and films, attend lectures, and participate in other activities. Rather, the center serves to narrow the communication gap between the scientific world and the layman, foster understanding, and create a pleasant learning environment, especially for those who view science as something apart from their everyday lives. George T. Tressel (1964, p.258), Director of the Office of Public Understanding of Science, National Science Foundation, said, "It is difficult to measure such recreational learning because each participant selects a different menu and leaves the museum with a different pattern of experience, impressions, and knowledge. It is disorganized, impulsive, and personal. But it is real."

The problem addressed here, however, is that of science education for school children, a concern far different from that of reaching the general public. Some of the answers are obvious, but are not economically feasible. More full-time staff might be employed by museum education departments, curriculum guides might be designed for teachers, and a multitude of science and math courses could be generated. But even if these miracles occurred they would not clarify the educational direction of science museums. In large metropolitan areas increased in-house programming, more staff and better teaching have a negligible impact on science education. An approach is needed that exploits the resources of the scientific community and encompasses industry and institutions of higher learning to provide high quality education for the bright and motivated.

Several years ago, recognizing the needs of science education, the Maryland Academy of Sciences moved with hopeful anticipation into the untried area of advanced instruction for the gifted and created a unique program, the Student Science Seminars. The goal to enrich and accelerate the science curricula of superior students brought rewards far greater than expected. Originally the program was designed for grades eight through 12. The seminars now include the elementary grades because the demand for programming of this nature was so great. Administered by the academy in cooperation with Maryland's public, private, and parochial school authorities, students meet in small groups at the science center, schools, and colleges throughout the state to study facets of science, technology, and mathematics not found in the school curriculum. The format varies according to the ability levels of the students.

The seminar program has a two-track system. Simply stated, one is for those scoring above the 90th percentile on standardized tests with IQ's of 120 or better and A's and B's in science and math-related subjects. These students are classified as bright and motivated. The other is for children who are under the age of 14, place above the 97th percentile and considered scientifically and mathematically precocious. In all, teacher recommendation and the results of other tests are taken into account.

In September of each year, an advisory committee of scientists, teachers, principals, science supervisors, and academy personnel convenes to review program evaluations from the preceding academic year and consider topics and leaders for the current one. Through this interaction, the academy does not duplicate established courses and concentrates on supplementing and augmenting school science curricula.

Once basic disciplines and topics are identified, general information and nomination forms are sent to all school systems. An overall survey course acquaints 8th, 9th, and 10th graders with general scientific principles. Those in the 11th and 12th grades are exposed to an in-depth study that emphasizes laboratory work with one scientist. Instructors for all age levels are practicing professional scientists and science educators. Student response has been extremely positive:

With plans to make marine science a career, I have worked hard towards developing an academic curriculum that has a concentration in science and mathematics. I hope you will consider me for admission into this seminar because I have not been able to take any course in high school like this.

Being able to attend the seminar on digital electronics will enable me to further my knowledge of electronics and circuit design, which are of great interest to me . . . The Cosmic Elf Computer, which appeared in Popular Electronics, August 1976, was one of the projects I built.

The in-depth seminars, which meet in a scientist's laboratory for eight 2½-hour sessions, are intense and permit the maximum interaction between students and leaders.

In-depth seminar leaders are encouraged to design courses that promote independent reseach. As a result, many students have begun major research projects and have received additional recognition in the form of advanced placement, part-time or full-time employment offers from local science-related industries or grant monies for their projects.

Because the program has earned the respect of the scientific and academic communities, there is no difficulty in staffing the courses with highly qualified teachers. Recommendations for good professors come from a variety of sources, resulting in an extensive network of contacts. Topics cover a wide range of disciplines and include the biological and physical sciences. Of 25 courses in the 1980 program, digital electronics, architecture, astronomy, symbolic logic, cellular physiology, microbial ecology and radiation biology were included. Because basic science courses are emphasized in the regular school curriculum, there is little room for such in-depth study.

The benefits of the program are multifold. Raymond Trimmer, director of education at the Maryland Academy of Sciences, enumerates:

First, there has been a commitment on the part of school officials, especially science supervisors, to formalize screening procedures for participants and to provide high quality programming. Next, students and their parents feel a great sense of pride in being nominated as bright and motivated by their schools' science and/or math teachers. And last, a considerable amount of time is spent by the academy's program coordinator and the advisory committee to identify a variety of disciplines and current topics in science, technology, and mathematics and to select seminar leaders who can stimulate and communicate well with young people.

For those very gifted students who place in the 97th percentile or above, the format is the same as for the in-depth seminars and the material covered is equally advanced. The exciting aspect is that these children are 12, 13, and 14 years old. Thanks to the renowned Study of Mathematically Precocious Youth, conceived by Julian Stanley, the academy has access to the names of children who score unusually well on SAT's and other measurements administered by Stanley's Office of Talent Identification and Development. Stanley views the academy's classes as "an introduction to college level study and a step towards advanced placement." He also considers them important because, "Creativity in these courses is prompted by the subject matter itself, the creative skills of the teacher and the influence of able classmates . . ." In addition to the Student Science Seminar, the academy also develops other gifted programs for the Maryland State Department of Education and for individual counties in the state.

The program is funded primarily by course fees, and the academy's general operating fund is derived from dues and donations. At present, fees range from $35 to $90 per course; academy members receive a discount. Some school systems pay a portion of the total cost, but in most instances the expense is borne by the parents. Scholarship aid is available, however, due to the fund-raising efforts of community groups, and no eligible student is refused admission for financial reasons.

Obviously, the academy's education department staff of 10 cannot possibly design, teach, and administer a program in 30 different locations throughout the state and still handle the myriad of in-house museum presentations aimed at all sectors of the population. Much of its success can be attributed to the cooperation of the school systems, the intelligence and motivation of the students, and the caliber and enthusiasm of more than 100 scientists employed in the program.

The majority of instructors are faculty members from Maryland colleges and universities, including the Johns Hopkins University, Loyola College and the University of Maryland. Scientists working in industries such as Martin Marietta Corporation and Westinghouse Electric Corporation are also recruited. In the past two years, a number have come from agencies such as the Baltimore Police Laboratories, Maryland State Board of Health, and the U.S. Army Research and Development Command.

Does this kind of science and math education help or hinder students in their academic pursuits? The academy developed evaluation techniques that compile statistical data and have proven highly beneficial in monitoring the program. Results are consistently positive, and school administrators emphasize that the program has helped students gain new academic direction. Comments from students

reflect their enthusiasm:

I found this year in high school extremely boring, (but) I looked forward to every (Maryland Science Center) session because it was the only "new" education I got this year.

I couldn't wait for Saturday mornings.

Thank you for letting me participate in your program. It was the best thing I did all year.

Although a trifle fast-paced, the seminar broadened my knowledge of the topic. The instructor cannot be described in anything but the most glowing and positive adjectives. His performance was superlative.

The courses have motivated students to pursue new areas of study. For the first time, these youths have not only met their intellectual peers in group settings, but have also developed friendships. Too often, because of their high intellect and advanced interests, they are viewed as "different" by their school classmates and find themselves on the sidelines socially.

William C. George, director of the Office of Talent Identification and Development at the Johns Hopkins University, is currently conducting longitudinal studies:

The effect of courses such as those offered by the academy has been positive. This has been ascertained by SMPY's (Study of Mathematically Precocious Youth) longitudinal follow-up of talent search participants after high school graduation. The follow-ups are designed to better understand the impact of identification and educational opportunities on these students.

In fact, many superior students who have attended laboratory sessions at a college or university and established a rapport with professors have later elected to attend that particular institution. Thus, the seminars seem to have eliminated some of the guess-work that many experience when applying to colleges.

The final, and perhaps the most essential, ingredient for the success of the program is the student. Since the purpose of the curriculum is to offer courses above the level of those in the schools, it is imperative to employ topnotch teachers. Research scientists and university professors are not expected to cope with learning difficulties or motivational problems, and wary scientists recruited for the first time find themselves won over by their lively pupils:

Excellent on all counts! In this year's seminar a few held back a little on participation, many were highly motivated, and all were thoughtful and perceptive. The seminar is hardly work — the program is a source of enjoyment for me.

I was impressed with the caliber of my students. They were obviously quite intelligent, and all were highly self-motivated and willing to put real effort into the work we did in the laboratory.

Working with these 13-year-old gifted and talented students was both a pleasure and a privilege. The students were eager to learn, quick to grasp, and presented a unique challenge to me as an educator.

There was a high percentage of very interested and motivated kids in my group. The course was more work than I bargained for, but I feel it was time well spent.

They're all enthusiastic, eager to learn and fun to teach. It's been such a high for me.

A science center is uniquely capable of offering accelerated, enriched programs that most schools, with their cumbersome bureaucracy, cannot provide. The success of these seminars and their continued expansion has been instrumental in establishing the Maryland Science Center as an important educational resource in the community. By offering science courses for the bright and gifted, the center serves as a link between the school systems and the scientific and academic worlds.

The Maryland Science Center speculates that if these seminar programs were expanded nationally they could have a major impact on the science literacy of future generations. It's something to think about.

REFERENCES

Bennetts, L. Organizing to overcome the pain of being different. *New York Times*, April 13, 1980.

Kimche, L. Science centers: a potential for learning. *Science*, January 20, 1978.

Maeroff, G.I. School science struggles less successfully than ever. *New York Times*, November 11, 1979.

Museums USA (National Endowment for the Arts, Washington D.C., 1974), p. 27.

Rice, B. [illegible] for the Gifted gold. *Psychology Today*. February 1980, p.56.

Salter, S. Parent efforts to aid the gifted gain momentum. Education Section, *New York Times*. November 11, 1979

Stanley, J.C., George, W.C. & Solano, C.H. (Eds.), *The Gifted and The Creative*. Baltimore: Johns Hopkins University Press, 1977.

Tressel, G.E. The role of museums in science education. *Science Education 64* (2).

[1]This article was reprinted with permission from *Museum News*, Vol. 59, No. 7, published by the American Association of Museums, 1055 Thomas Jefferson St., NW, Washington D.C. 20007, copyright 1981.

[2]Mary B. Hyman is the Director of the Department of Education at the Maryland Science Center.

TIPS
(Tips for Intellectually Precocious Students)

IT IS NEVER TOO EARLY TO START THINKING ABOUT AP[1]

Camilla P. Benbow[2] and *Julian C. Stanley*[3]

We at SMPY keep emphasizing the Advanced Placement Program (AP) examinations of the College Entrance Examination Board, Princeton, New Jersey 08541. (Benbow, 1978, p.1; Stanley, 1977). This is because it is one of the best ways to earn college credits while still in high school. Approximately 23 examinations in 12 subject areas are offered nationwide every May for $42 each.

AP examinations (and courses) are given in the following subjects: American History, Art History, Art (studio), Biology, Chemistry, Classics, English, European History, French Language, French Literature, German Literature, Calculus (Levels AB and BC), Calculus Levels AB and BC), Music (Listening and Literature), Music Theory, Physics (Levels B and C), Spanish Language, and Spanish Literature. Most of the above examinations are three hours long.

NOW is the time to begin thinking about how you will become well prepared before next May to take anywhere from 1 to 10 of those exams and act upon these plans. The rewards are rich: less boredom and more intellectual stimulation in high school while you study at the college level in AP subjects; exemption from the first-year course in college so that you can move initially into more appropriately difficult materials there; and college credit that can cut the number of semesters you will need to earn a bachelor's degree.

These AP exams are money savers, too. With college tuition charges alone (not counting living expenses) at many private colleges near or above $4,000 per academic year, the eight credits that, for example, one can earn for Level BC Calculus can make the $42 cost of that exam save over $1,000, a pay-off of better than 27:1. Furthermore, by taking several AP exams, college courses on the side while still in high school, and modest extra course loads in college, it is not too difficult for an able and well motivated student to complete college in 6 semesters or less, rather than the usual 8. Not only does this save at least a year of tuition, but it also gets the student a year or more ahead toward his or her career. The "accumulation of advantage" tends to multiply thereafter.

Do not, of course, confuse the AP exams with the College Board's Achievement tests. The former are at college level, whereas the latter cover the standard content of high-school courses. Except sometimes for foreign languages, one cannot usually get any college credit for the achievement tests. Below are listed some precautions and suggestions concerning AP courses and exams:

1. An available publication to help you plan and study for the AP examinations is the Advanced Placement Course Description for each subject. Each such syllabus contains an introduction describing the AP program, how the exams are graded, and what the grades mean. The syllabus itself describes the course work and the skills students are expected to master. It includes sample examination questions and in some instances recommends texts by specific authors. These syllabi are available from the College Entrance Examination Board, Publications Order Office, Box 592, Princeton, New Jersey 08541, at a cost of $2.00 each.

2. If there is not a recommended text in the syllabus for an AP subject in which you are interested, inquire as to which texts are being used in honors courses in the desired subject at a selective college near your home.
3. In addition, past examination questions are also available for all subjects in which the examinations have been given. A set of questions from the 1970-77 examinations on each subject is available from the College Entrance Examination board, Publication Order Office, Box 592, Princeton, New Jersey 08541. The cost is $2.00. Tape recordings or slides of examinations on certain subjects are also available from the above office.
4. Some high schools offer AP courses that can prepare able students rather well for the AP exams. Unfortunately, most high schools offer few or not true AP courses, and most so-called honors or advanced courses fall considerably short of being ideal. Therefore, the typical student aspiring for AP credit in a subject must supplement his/her classwork and homework considerably. This, however, is not very difficult for an efficient planner.
5. The teacher of an appropriately conducted AP course will utilize all available means for helping the students do well on the exam. These include carefully following the AP syllabus, attending AP-course instructional sessions, explaining how the AP exam will be conducted and graded, using sample items, and administering practice AP exams. Teachers not utilizing all such supplements probably get poorer results than the ones who use them do. Students may urge their teachers to conduct the course at the right level and with the AP exam firmly in mind from September to May.
6. Anyone may take an AP exam in any year of school. He or she does not have to enroll in an AP course in order to take any of these exams. By studying extensively on one's own, it is, in principle, possible to prepare well for an AP exam. For example, as a tenth grader, one of the SMPY's 15-year olds, did so excellently in both biology and chemistry.
7. It is best for students to take an exam in May of the year in which they have completed a particular course (if such a course was taken). Students are warned not to wait to take all AP examinations in May of their senior year. If the student does not score well enough the first time, the exam can be take again the next May.
8. To register for an AP exam, see the AP coordinator at a senior high school. The high school will send all applications to ETS (Educational Testing Service). The deadline for registration is determined independently by each school. If the high school does not have an AP coordinator, go to the nearest school that does and register with him or her. If this is not feasible, write to Dr. Harlan P. Hanson, Program Services Officer (AP), College Entrance Examination Board, 888 Seventh Avenue, New York, New York, 10019.
9. The AP exams one takes will depend on one's own interests and abilities, local school situation, and college plans. It is advisable to find out in detail far in advance — and preferably in writing — just what the AP rules of the colleges to which one is considering applying actually are. Unfortunately, many admissions officers are less than candid and complete about these matters unless the student is persistent. Another publication from the College Entrance Examination Board entitled *College Placement and Credit By Examination* (priced at $7.95) could be helpful here. It provides detailed information concerning which colleges offer advanced standing for varying degrees of performance on both the Advanced Placement Program examinations (AP) and the College-Level Examination Program examinations (CLEP). In addition, this CEEB publication offers a listing of institutions that have " . . .reported their readiness to award immediate Sophomore Standing or its local equivalent to students presenting locally qualifying grades in 3, or in some cases, 4 full Advanced Placement Examinations." Requests for copies of this book should be addressed to College Board Publications Orders, Box 2815, Princeton, New Jersey 08541.
10. Another set of recommended articles for the student interested in AP exams is by Patricia Lund Casserly (1968-69) and entitled "What College Students Say About Advanced Placement." It presents fascinating glimpses into the minds of a large number of college students as they recall their preparation for the AP exams, or lack of it, and how this affected their college careers. For reprints (presumably, without charge) write The Editor, College Board Review, College Entrance Examination Board, 888 Seventh Avenue, New York, New York 10019.

There are many other ways of advancing one's education. Overall, however, AP credits by examination are definitely a "best buy." They should be sought by many more able youths than is done at present, but with good planning and considerable care. Every senior high school should have a teacher, counselor, or administrator who is designated specifically to help students interested in taking AP exams. If no such individual has been appointed, the department chairpersons should be well informed about AP matters in their subjects. Failing both of those, the student may have to deal directly with the AP office, whose address was given in the first sentence of this article. The telephone number is (609) 921-9000. Ability, effort, and determination directed toward AP exams will pay handsome academic, personal, and financial dividends.

In short, taking AP exams is a prime way to gain "cumulative multiplicative advantage" in one's future career. As Harriet Zuckerman (1977) points out in her *Scientific Elite*, getting such advantage early is how eminent scientists, such as Nobel Laureates and members of the National Academy of Sciences, are created. As high-school students the current "greats" did not have the advantages of AP exams. Modern youths are more fortunate.

REFERENCES

Benbow, C. P. Prepare now for AP examinations. *Intellectually Talented Youth Bulletin*, 1978, *4* (5).

Casserly, P. L. What college students say about Advanced Placement. *The College Board Review*, Number 69, Fall 1968; Number 70, Winter, 1968-69.

Stanley, J. C. Gather ye AP credits while ye may. *Intellectually Talented Youth Bulletin*, 1977, 3 (10), 12-14.

Zuckerman, H. *Scientific Elite: Nobel Laureates in the United United States*. New York: The Free Press, a division of McMillan Publishing Co., Inc., 1977.

[1]This article was reprinted from the *ITYB* (Intellectually Talented Youth Bulletin), Vol. 4, No. 10 (Summer, 1978), pp. 4-6.

[2]Dr. Camilla P. Benbow is Assistant Research Scientist in the Department of Psychology and Associate Director of the Study of Mathematically Precocious Youth (SMPY) at The Johns Hopkins University.

[3]Dr. Julian C. Stanley is a Professor in the Department of Psychology and Director of the Study of Mathematically Precocious Youth (SMPY) at The Johns Hopkins University.

TAPS (Tips for Artistically Precocious Students) ARTS RECOGNITION AND TALENT SEARCH (ARTS)

The Arts Recognition and Talent Search (ARTS) is a national program which seeks to identify, recognize, and encourage youngsters who have demonstrated excellence in dance, music, theater, the visual arts, and writing.

Administered by the Educational Testing Service, the program awards scholarships and apprenticeships to outstanding young artists whose work has been judged to be excellent by panels of distinguished artists and art educators representing the five art disciplines covered. In addition, a group of finalists is identified from the graduating high school senior applicants for consideration by the Commission on Presidential Scholars for the Presidential Scholars Program, which honors the nation's most accomplished high school seniors.

To be eligible to participate in the Arts Recognition and Talent Search, you must:

- If in high school, be a senior.
- If not in high school, be studying privately or be involved in an organized arts activity and be 17 or 18 years old.
- Not be enrolled in postsecondary education unless an accelerated student in your first year of college while completing requirements for a high school diploma.
- If living in the United States, be a citizen or express your intent to become a citizen. If living outside the United States, be the child of a U.S. citizen.

To receive a registration form for the 1982-83 Arts Recognition and Talent Search contact: ARTS Recognition and Talent Search, Box 2876, Princeton, New Jersey 08541. Phone: (609) 734-1090.

BOOK REVIEW: *GIFTED YOUNG CHILDREN*

by Wendy Roedell, Nancy Jackson, and Hal Robinson

*Jadis Ullman Cuzme**

Although this volume is directed primarily toward educators, it serves as an excellent introduction to the study of gifted preschoolers for both parents and teachers. In it, the authors discuss the nature of giftedness (including a brief general history of the concern for gifted children), characteristics of gifted young children, methods of identification of gifted performance in young children, and the types of programs which are being made available to them.

The first step in designing a program for gifted children, or in looking for a program for a gifted child, is to clarify one's definition of giftedness. A gifted child may be one who excels in music, the arts, academics, logic, creativity, athletics, or any number of other areas. Generally, however, giftedness in our society has come to mean superiority in abstract reasoning. The authors outline the difficulty in deciding whether intelligence is a unitary trait (a general factor), or a trait made up of a large number of elementary abilities (or specific factors). They note that many psychologists maintain a compromise position in which they see various specific factors joining into group factors. The tendency, however, has been to equate intelligence with scores on general intelligence tests: that is, to equate intelligence with IQ.

Although many checklists are available that purport to distinguish gifted children from others on the basis of physical, social, and emotional characteristics, it is pointed out that "the most striking characteristic of gifted children is their diversity." Several studies are mentioned in which no relationship between IQ and physical growth or IQ and performance on simple motor tasks was found. It is possible that there is some relationship between general cognitive ability and motor tasks that involve cognitive organization. Likewise, studies of early development do not show a relationship between precocity during infancy and IQ as measured at age four. The child who walks and talks early may not necessarily be more intelligent than his less precocious age-mate.

The fact that bright children show individual differences in general temperament poses many problems in identification. Again, many of the checklists available to identify gifted children include traits which are actually temperamental, in spite of the results of several studies cited here which confirm the variety of temperament in gifted children. The IQ of a child who is slow to become involved in new material or who is hesitant about joining a group is often underestimated by his teacher, while the intelligence of a child who "plunges" into new work, shows interest in new activities, and is not easily distracted is often overestimated. The results can be damaging to the bright child who has been "misclassified."

Problems in social and emotional adjustment of the gifted preschooler may have their roots in the frustration caused by the discrepancy between what he understands and what he can do. There may be a gap between his intellectual level and his physical level (as in the case cited here of a child reading at the fourth grade level but unable to hold a pencil), or between his intellectual level and his emotional level (as with the child who reasons like an eight year old, but hits and kicks when frustrated). He may have difficulty dealing with less able peers: it is difficult to explain to a four year old why his friends can't read or tell time. In general, however, bright children tend to be popular, and to be better able to predict their social status. This is more likely, especially with very young children, if they have the opportunity to interact with other children of high ability.

It is important to note that the authors have found great variability in intellectual development among bright preschoolers as well. Some children tested by the authors at the Child Development Preschool in Seattle, Washington, were very advanced academically, but others were not. Some showed extremely high ability in one area, such as spatial reasoning, but others did not. Some obtained very high scores on IQ tests, but others did not. It is because of this diversity that the authors recommend identification on the basis of the child's "best score." This is only possible if an entire battery of tests is considered at once.

Tests used to identify able children should be reliable and valid: standardized tests should be used whenever possible. Often, however, children of extraordinary ability hit the "ceiling" of tests designed for their age group. When this occurs, a test designed for older children should be administered, even if the results must be extrapolated down. Because young children are often easily distracted or are not used to testing situations, a low score on a test should not in itself be taken to mean that the child cannot perform the tasks included on the test. The child's background, and any handicapping conditions, must be carefully taken into account before assessing the results of any test or test battery. Again, the child's "best performance" should serve as a determining factor in identification.

At the Child Development Preschool, the authors supplemented standardized testing with comprehensive parent questionnaires which focused on intellectual and academic abilities. The questionnaire items were specific, leaving as little as possible to parental judgement. Open-ended questions were also included, which allowed parents the opportunity to volunteer more detailed information.

When developing a program for gifted students, the authors stress the importance of observation of the child, the creation of a learning atmosphere (and the provision of enthusiastic behavior models), development of social skills, and the development of thinking skills. They argue against "deceleration" of the bright child: that is, the attempt to make a child learn more slowly than his developmental rate would indicate. "The classroom environment [should adapt] to a child's need for rapid progress."

Finally, the authors discuss several programs that are currently available in various areas in the United States. These include traditional programs, programs that stress creativity, programs for handicapped children, programs which use parents as teachers, their own Child Development Preschool in Seattle, and early entrance to kindergarten or first grade. The results of the latter were considered generally positive except for children whose development is uneven (those who are advanced intellectually but do not show equivalent social or emotional advancement).

Gifted Young Children is extremely well documented: research and/or case studies are used consistently to support the authors' statements, giving the reader both increased confidence in the work and excellent sources for further study. Although the sections on the nature of giftedness and the characteristics of gifted young children could easily be expanded, the information that is given is concise and well written. As an introductory text, it would be difficult to improve upon, and the reader is left with only one question: Where is Volume II?

*Jadis Ullman Cuzme is a PSAP Project Associate working on a Masters Degree in the education of the gifted at Arizona State University. She formerly was a Montessori preschool teacher.

ANNOUNCING ARIZONA'S FIRST COMPUTER CAMP

*Pat Walkington**

Mingus Springs will host Arizona's first computer summer camp for students 8 to 15 years old. The camp is located on Mingus Mountain between Prescott and Jerome.

The program will focus upon teaching students to program in BASIC and LOGO while applying their skills to environmental problems found through field study and conservation projects. Student's skills in programming will be assessed and instruction provided commensurate with individual abilities and interests. Radio Shack and Texas Instruments have donated approximately 36 microcomputers for student use. This will provide tremendous flexibility while exposing students to different microcomputer systems.

Specific environmental projects will include building dams, conducting water, vegetation, animal, and soil studies, and completing projects to improve local wildlife habitats. In this setting students will use the computer as an instructional tool to assist with environmental investigations.

Camp this year will be divided into four one-week sessions. The first two sessions are geared to students ages 8 to 12 (8 to 11 - all levels of computer experience; 12 year olds - little or no computer experience). Session I will begin on June 20th and extend through June 26th. Session II begins June 27th and ends July 3rd. Students may attend one or both sessions at a cost of $245.00 per session.

Sessions III and IV are geared to students ages 12 to 15 (13 to 15 - all levels of computer experience; 12 year olds - more extensive computer experience). Session III will begin on July 4th and extend through July 10th. Session IV will begin on July 11th and extend through July 17th.

Students may attend one or both sessions for a cost of $245.00 per session.

In addition to computer programming and environmental studies students will enjoy a wide variety of camping experiences. These include hiking, swimming, tennis, fishing, field sports, campouts, astronomy, dances, and talent shows. A well-trained staff and excellent facilities will make this an experience your child will long remember.

For further information, please contact: Camp Director, c/o Dr. Henry Dahlberg, 2946 Darca Drive, Prescott, Arizona 86301, (602) 445-3778. The Arizona Computer Camp is a project of the Henry E. Dahlberg Foundation, a nonprofit organization.

*Ms. Pat Walkington is the Director of Gifted Education in the Paradise Valley School District in Paradise Valley, Arizona.

1981 NAGC CONFERENCE REPORT

*Barbara Wright**
*Linda Moran**

The 1981 National Conference of the National Association of Gifted Children was held November 18-21 in Portland, Oregon. For four days teachers, administrators, and university personnel attended, met, and discussed the growing concerns of education for the gifted child. As visitors from Arizona, we found the Portland conference to be not only educational but also thoroughly enjoyable. There were a variety of speakers on a diversity of topics, the conference was organized professionally and functioned smoothly, the accomodations at the Marriot Hotel were outstanding, the cuisine superb, and nature cooperated giving a beautiful touch of autumn outside from golden maples to brisk ocean winds with occasional splashes of rain.

Inside the conference, the acceleration vs. enrichment controversy continued to rage in its full fury, vocally presented in a "Great Debate" Thursday evening by Dr. John Feldhusen, Purdue University, Dr. James Gallager, Chapel Hill University, Dr. Catherine Bruch, University of Georgia, Dr. Barbara Clark, California State University, and Dr. Joseph Renzulli, University of Connecticut. Perhaps the biggest surprise of the debate was presented by Dr. Gallager, long a proponent of creativity training programs for the gifted, in a statement in which he came out strongly in support of academic acceleration. A lack of tangible results in the past decade attempting to teach creativity contributed to his support of acceleration.

A wide variety of offerings greeted participants including: "Identification of Pre-School Gifted," "SPACE: Special Programs for Advanced Career Exploration," "Synectics and Its Many Uses in Gifted Education," "Learning How to Effectively Manage Your Advocacy Drive," "Bloom Where You Are Planted, A Starting Point," "The Essense of a Mentor," "Uses of Writing in Programs/Secondary Level Gifted Students," "Strategies for Teaching Literature to Gifted Secondary Students," and "A Program That Matches Student Strength to Course Content."

Friday morning, participants were treated to Dr. Joyce Van Tassel-Baska speaking about "Curriculum for the Gifted and Talented." Of particular interest was her analogy to getting ahead in administration with coaching a sports team. She also emphasized the value of reestablishing Latin as a primary part of the curriculum. Dr. Robert Sawyer, Director of the Talent Identification Program (TIP) at Duke University, spoke about the many and varied mechanics of running a Talent Search at Friday's luncheon. Highlights included similarities and differences of Talent Searches throughout the country.

The most moving moment of the conference was the presentation of a posthumous award in honor of Dr. Hal Robinson, former Director of the Child Development Research Group at the University of Washington, for his outstanding work in the identification of gifted pre-school children.

Now that the 1981 NAGC National Conference is history, it is with great pleasure that we look forward to the 1982 NAGC National Conference to be held at the Hyatt Regency in New Orleans October 19-23, knowing the organizers will have a high standard to attain to produce a conference of the same quality.

*Barbara Wright and Linda Moran are classroom teachers in the Cartwright Elementary School District in Phoenix, Arizona. Both are PSAP Project Associates and teach classes for PSAP at Arizona State University. In addition, they have helped develop and maintain the current program for the gifted at their junior high school.

WOLFGANG AMADEUS MOZART

*Carol Irwin**

"Wolfgang Amadeus Mozart," wrote H. L. Mencken, "Like Schubert, is beyond analysis: he simply happened." Mozart happened, in part, as a result of a driving, ambitious father who was determined to make a prodigy out of his son (Fisher, 1973).

Wolfgang was born on Sunday, January 27, 1756, in Salzburg, Austria. His father, Leopold, was a musician, a violinist, court composer, and conductor of the local orchestra. His mother was a cheerful, good-natured woman who made the home comfortable and happy. Wolferl, as he was affectionately called, was surrounded by music making from the earliest moments of his life. His sister Nannerl, who was five years older than he, started taking lessons on the clavier at the age of seven from their father. When Leopold and Nannerl were at the clavier, Wolferl would drop his toys and stand spellbound until they were finished. He would then reach up and touch the keys until he could find a third. When he struck a discord, he would cry and immediately try to remedy his mistake. Gradually he would pick out the tunes which Nannerl was playing.

When Wolferl was four, Leopold thought it would be fun to teach him how to play the clavier. Within a year, Wolferl did not care for anything else and would sit at the clavier for long periods of time. In her book on Mozart, Davenport (1956) reports, "Each moment of his learning time was priceless, equal to weeks in an ordinary life. He seemed to know everything before it was told to him. Such was his musical instinct that he probably did know."

One afternoon when Wolferl was four, a friend of Leopold's came home with him and they found Wolferl writing music. He had made a mess with ink everywhere. Instead of Leopold scolding him, he asked what he was doing and Wolferl replied that he was writing a concerto for the clavier, and that it would soon be finished. Leopold and Schactner exchanged smiles, but when they examined it, they were amazed for he had written a concerto too difficult to play. Wolferl told them that it was so hard because it was a concerto and a person had to practice it until it was perfect.

The next year, Wolferl brought his tiny violin out and begged to play with the string quartet rehearsing at his home. He had never taken a lesson on violin but had listened to his father play and it soon became evident that he was playing the second part perfectly. Shortly after this, Wolfgang's public life began when Leopold arranged concert tours for him and his sister Nannerl all over the continent. They were introduced to royalty, played for long hours, charmed these royal patrons, but rarely made enough money to pay their expenses. Fisher pointed out that they did not have a formal education, but learned all they knew from their father's instruction, who emphasized especially languages (Fisher & Besch, 1969). However, when Wolfgang was introduced to arithmetic, he was so excited that he scribbled problems everywhere. This passion for mathematics is plainly in close alliance with his great contrapuntal ability according to Davenport (1956).

On one of these tours, at the age of seven, they went into a church in Heidelberg where Wolfgang played for an hour on the organ. The choirmaster was so touched by his playing that he ordered Mozart's name and age carved on the organ case and the date of the miracle he had seen.

At age eight, Mozart played with Johann Christian Bach, who said of his playing, "It surpasses all understanding and all imagination" (Fisher, 1973). Shortly after this, the Philosophical Society investigated his ability, testing him by covering the keys, asking him to improvise, to play at sight and compose in different styles. He passed all tests. It was a fact that he could read at sight, transpose, improvise, and compose before he was ten years old.

When in Rome, at age eleven, he and his father were listening to the Allegre Miserere, a work considered so sacred that singers were forbidden to take their parts out of the chapel for fear they would be copied. Mozart went home and wrote the entire score from memory including the double choir parts.

At age fourteen, he was the youngest ever admitted to the Philharmonic Academies of both Bologna and Verona.

Wolfgang was governed by his parents most of his life. His father was the dominating force, guiding his career, looking after his finances and personal needs, but his mother also went with him on some of his tours. It was during one of these tours to Munich that he met his first love, Aloysia Weber. His parents did not approve of the relationship and forced him to go on to Paris where his mother died. He later married Constanze in 1782, the sister of Aloysia, and grew to love her very much. They had several children but only two sons lived, Karl and Franz Xaver. Wolfgang had trouble making enough money to support

his family even though he sold his compositions, gave performances, and music lessons. Their medical expenses were great and when Emperor Joseph II finally appointed him as court musician, he paid him so little that Wolfgang still could not make ends meet. He died penniless.

During the traumatic periods of his life he wrote his greatest music. His melodies are generally held to be the most beautiful ever written, and he had the ability to write in all forms of music. He loved opera from early childhood and had great success, though short-lived, from his two Italian operas, *The Marriage of Figaro* and *Don Giovanni*. His German opera, *The Magic Flute*, was innovative and formed the model for later operatic works. He composed over six hundred works, including twenty-two operas, forty symphonies, orchestral, chamber music, and church music of which the *Requiem* may be considered by some the greatest work ever written. More than any other musician, Mozart helped to make the piano a popular instrument. His melodies had a "singing" quality which demonstrated the loud and soft qualities of the piano (World Book Encyclopedia, 1982, p.752).

The last years of his life were tragic because he was weighed down by debts, failing health, utter frustration over lack of recognition, but driven with his tremendous creative power. He felt Salieri, the chief court composer, who for many years was an arch rival, was trying to poison him. His hallucinations increased, but his writing of the *Requiem* continued feverishly until the final hours of his life. He told everyone that he was writing the *Requiem* for his own death. He died December 5, 1791, was buried in an unmarked grave with only his wife and a few friends present.

According to Davenport (1956), Mozart's music has been described, " . . . as architecture because it is built with the same instinct for proportion and the same fidelity to elemental laws of structure that built the Parthenon and Chartres Cathedral. The accident that Mozart happened to be full of spontaneous melody, dramatic fire, tender humor, sophisticated grace, and profound emotion is a bonanza of Providence. Such an accident does not happen twice.

"God planted in Wolfgang Mozart what is probably the purest, sheerest genius ever born in man, and then placed it in the care of Leopold. The resultant flowering was no accident."

His music will live forever.

REFERENCES

Davenport, M. *Mozart*. New York: Charles Scribner & Sons, 1956.

Fischer, H.C. & Besch, L. *The Life of Mozart*. New York: St. Martin's Press, 1969.

Fisher, R.B. *Musical Prodigies Masters at an Early Age*. New York: Association Press, 1973.

Mozart, Wolfgang Amadeus. *World Book Encyclopedia*, 1982.

ACCELERATE WITH APPLES

*J. P. Boyle**

This article is not about a new exotic energy source. It is rather a description of the utilization of Apple II micro-computers to aid in the instruction of academically talented children. Computer-Assisted Instruction (CAI) has become a component of the Project for the Study of Academic Precocity of Arizona State University. The utilization of CAI is coming to the forefront as a viable process in education. Educators are seeking ways and means to best utilize and evaluate this exciting technology.

It has long been recognized that every person learns individually regardless of the instructional mode. Some students may be excellent in math, but lag in verbal abilities or vice versa. Some learners are bored waiting for the group to learn what they already know. Others seem to never catch up to their peers. Therefore, the value of individualized learning has never been questioned by educators. The problem has been that an appropriate educational delivery system has not been available, other than the use of human resources in a tutorial setting. The utilization of human resources becomes a most expensive process and, in a time of financial restraints, schools are returning to the large group instructional process with all its inhibitions to individualized learning. The advent of micro-computer technology and its relative low cost may be the breakthrough to programs of individualized learning, which were never before possible. The challenge now faced by educators is how to employ and integrate this technology most effectively with a complete educational program. One method is to seek out successful models.

Ombudsman Educational Services has been serving students in alternative schools in Illinois for eight years and recently opened a program in Mesa, Arizona. The students served by Ombudsman were generally rejects from the traditional schools. They represented a wide range of age and ability levels, but generally had been unsuccessful in school. To meet the needs of this group, Ombudsman initiated a totally individualized learning program in which each student was diagnosed as to his entry level and prescribed an appropriate learning program. The student was then directed to various learning activities and his progress evaluated.

Initally one of the "branched teaching machines" with very strong learning programs was employed as the core of the educational delivery system. Branched programming is a system of monitoring student responses to questions to determine if learning has occurred or if review or remediation is required. Students work at their own pace on appropriate programs to master concepts at their own level. A few years ago the "branched teaching machine" became unavailable. Ombudsman then began the task of converting the programs of the teaching machines to the Apple II microcomputer. The use of these programs now allows the computer to function in much the same way as a human tutor functions — diagnosis, prescription, treatment, and evaluation — at a far less cost in terms of financial resources.

James Boyle, President of Ombudsman Educational Services met with Dr. Cohn, Director of PSAP, to explore the use of CAI in his learning laboratory at ASU. It was agreed that Ombudsman would supply Apple II microcomputers and programs and in-service as a pilot program with the academically gifted. Dr. Cohn will be collecting data on the use of CAI to validate this educational process.

It has been stated that "with a computer it is impossible for a student not to learn." Given appropriate programs, a vast array of learning activities become available. For example, if a third-grade student is ready to begin learning fractions, a complete course is available covering each concept from what is a fraction through division of fractions. At this point, upon demonstrating mastery of fractions, the student may move directly to decimals. Once arithmetic concepts are mastered, the student moves to algebra and geometric concepts, at his own rate. Recently a student at Ombudsman's facility in Mesa raised his score on the SAT by over 200 points with only eleven hours of Computer-Assisted Instruction on a College Entrance Examination Program.

Another side benefit of CAI is that in using a computer, students demonstrate a curiosity about "how it works." This curiosity can be satisfied by programs which will teach the student basic computer programming. Learning to program has many benefits to the student and the educational process. First, it requires the student to develop logical thought processes. Second, it develops a very disciplined approach to learning. The student cannot go from point A to point D without addressing points B and C. These two programming requirements then have a tendency to "carry-over" into other forms of learning.

An eductional tool is only as effective as the teacher using it. As teachers become more familiar with CAI, its effectiveness will undoubtedly benefit more students — both gifted and those needing remedial help. The use of CAI in an accelerated program is an exciting approach and one that will be viewed by many educators as a look into the future.

*Mr. Boyle is President of Ombudsman Educational Services, Inc., Chicago, Illinois.

SUMMER PROGRAM OFFERED BY SIMON'S ROCK

Simon's Rock of Bard College in western Massachusetts is offering a summer program for high school students from June 27 through July 24, 1982. The program, sponsored by the Bard College Center will offer Creative Writing, French, Spanish, English as a Second Language and American Studies, and the Art of Mathematical Thinking and Problem Solving Strategies.

Eligibility for the program is not necessarily limited by age or specific academic criteria except in the case of the mathematics class for which students must have completed ninth or tenth grade with at least a B+ in math, one year of algebra and one year of geometry, be in the top 10% of one's class or achieved a mathematics PSAT score of at least 600, and be recommended by the student's mathematics teacher.

Applications must be submitted by April 20 to ensure first consideration. Students will be informed of acceptance or rejection by May 1. For additional information and an application form, write or call the Director of Admissions, Simon's Rock of Bard College, Great Barrington, Massachusetts 01230, telephone number: (413) 528-0771.